Encephalitis (Non-Arboviral)

Report Immediately

Note: This chapter focuses on the non-arboviral infectious encephalitides (the types not transmitted by insects). For information about arboviral encephalitis, refer to the chapter entitled "Encephalitis, Arboviral."

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Infectious agents that can cause encephalitis include bacteria, viruses, fungi and protozoans. Viral causes include herpesviruses, enteroviruses, mumps, measles and varicella viruses; nonviral causes include bacteria such as *Listeria* and *Leptospira*, fungi such as *Histoplasma capsulatum* and *Cryptococcus neoformans*, and protozoa such as *Toxoplasma gondii*.

B. Clinical Description

Encephalitis is an inflammation of the brain. Symptoms vary depending on the etiologic agent and include alterations of consciousness, fever, headache, lethargy, confusion, and seizures. Since encephalitis can coexist with inflammation of the meninges, symptoms of meningitis (such as fever, headache and stiff neck) may also be present.

C. Reservoirs

Humans are the reservoir for enteroviruses and for mumps, measles, herpes simplex, and varicella viruses. *Histoplasma capsulatum* and *Cryptococcus neoformans* are organisms found in soil, especially soil contaminated with bird droppings. Cats (and members of the cat family) are the definitive hosts for *Toxoplasma gondii*; they acquire the parasite from eating infected rodents or other meat. Monkeys are the reservoir for Simian B virus (cercopithecine herpesvirus 1).

D. Modes of Transmission

Enteroviruses are transmitted person-to-person through ingestion of contaminated human fecal matter or through exposure to infectious respiratory droplets. They may also be transmitted indirectly via fomites. Some causes of encephalitis, such as *Listeria* sp. and *Toxoplasma gondii*, may be acquired through consumption of contaminated food. Measles and varicella viruses are transmitted person-to-person through the airborne route. Simian B disease is transmitted to humans through monkey bites or exposure of naked skin or mucous membranes to infectious monkey saliva or monkey tissue culture.

E. Incubation Period

For most enteroviruses, the incubation period ranges from 3–6 days. For herpes simplex, it is 2–12 days, for Simian B disease, 3 days to 3 weeks, for histoplasmosis, 2–17 days. Incubation periods for some of the other agents that can cause encephalitis (*e.g.*, measles, mumps, varicella, etc.) can be found in their respective disease-specific chapters in this manual.

F. Period of Communicability or Infectious Period

The period of communicability varies by etiologic agent, with some of them not transmitted person-to-person (*e.g.*, histoplasmosis and toxoplasmosis). Enteroviruses may be shed in feces for several days to many weeks after symptoms have resolved. Enteroviruses may also be shed in respiratory secretions, usually for no longer than 1 week following symptoms.

G. Epidemiology

Most of the etiologic agents that cause encephalitis are found in most parts of the world, with sporadic cases occurring throughout the year. Enteroviral infections peak in the late summer and early fall in temperate zones.

2) REPORTING CRITERIA AND LABORATORY TESTING SERVICES

A. What to Report to the Massachusetts Department of Public Health

- Report any case of healthcare provider-diagnosed encephalitis, with or without laboratory culture results indicating the presence of a causative pathogen.

Note: For encephalitis caused by an organism that is otherwise reportable, such as *Listeria* sp., *Toxoplasma gondii,* measles virus, varicella virus, etc., or for encephalitis caused by an arborvirus, please refer to Section 2) A of the chapter specific to that organism or disease. Otherwise use the criteria above. See Section 3) C below for information on how to report a case.

B. Laboratory Testing Services Available

The Massachusetts State Laboratory Institute (SLI), Viral Serology Laboratory can provide testing for many of the agents that can cause encephalitis, both arborviral and non-arborviral. Contact the Viral Serology Laboratory at (617) 983-6396 for information on particular viruses and how to submit specimens; call the SLI Reference Laboratory at (617) 983-6607 for non-viral agents.

3) DISEASE REPORTING AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To maintain a record of reported cases so increases in numbers of cases can be identified, thus facilitating appropriate control and prevention initiatives.

B. Laboratory and Healthcare Provider Reporting Requirements

Please refer to the lists of reportable diseases (at the end of this manual's Introduction) for information.

Note: Due to the potential severity of non-arbovrial encephalitis, the Massachusetts Department of Public Health (MDPH) requests that information about any suspect or known case of non-arboviral encephalitis be **immediately reported** to the local board of health where diagnosed. If this is not possible, call the MDPH Division of Epidemiology and Immunization at (617) 983-6800 or (888) 658-2850 (weekdays), or (617) 983-6200 (emergency number for nights/weekends). A case is defined by the criteria in Section 2) A above.

C. Local Board of Health Reporting and Follow-Up Responsibilities

1. **Reporting Requirements**
   Massachusetts Department of Public Health (MDPH) regulations (*105 CMR 300.000*) stipulate that each local board of health (LBOH) must report any case of non-arboviral encephalitis, as defined by the reporting criteria in Section 2) A above. Current requirements are that cases be reported to the MDPH Division of Epidemiology and Immunization, Surveillance Program using an official MDPH *Generic Disease Reporting Form* (in Appendix A). Refer to the *Local Board of Health Reporting Timeline* (at the end of this manual's introductory section) for information on prioritization and timeliness requirements of reporting and case investigation.

2. **Case Investigation**
   a. **The most important thing a LBOH can do if it learns of a suspect or confirmed case of non-arboviral encephalitis is to immediately call the MDPH with initial information, any time of the day or night.** Daytime phone numbers for the Division of Epidemiology and Immunization are (617) 983-6800 and (888) 658-2850. The phone number for nights and weekends is (617) 983-6200.

b. Following immediate notification to the MDPH, it is the LBOH responsibility to complete an MDPH *Generic Disease Reporting Form* (in Appendix A) by interviewing the case and others who may be able to provide pertinent information. Much of the information required on the form can be obtained from the case's healthcare provider or the medical record.

c. *Note:* For encephalitis caused by a specific organism that is reportable, such as *Listeria* sp., *Toxoplasma gondii*, measles virus, varicella virus, etc. or arboviral encephalitis, please refer to the chapter specific to that organism or disease for reporting criteria.

d. Use the following guidelines to assist you in completing the form:
   1) Record encephalitis as the disease being reported.
   2) Indicate the bacterial, viral or other organism isolated/identified and type of specimen from which the pathogen was isolated/identified, if known.
   3) Accurately record the demographic information.
   4) Record the date of symptom onset, whether hospitalized and other associated dates. Other medical information can be recorded in the "Comments" section at the bottom of the page.
   5) Complete the "Import Status" section to indicate where the infection was acquired. If unsure, check "Unknown."
   6) Include any additional comments regarding the case.
   7) If you have made several attempts to obtain case information, but have been unsuccessful (*e.g.,* the case or healthcare provider does not return your calls or respond to a letter, or the case refuses to divulge information or is too ill to be interviewed), please fill out the form with as much information as you have gathered. Please note on the form the reason why it could not be filled out completely.

e. After completing the form, attach lab report(s) and fax or mail (in an envelope marked "Confidential") to the MDPH Division of Epidemiology and Immunization, Surveillance Program. The confidential fax number is (617) 983-6813. Call the Surveillance Program at (617) 983-6801 to confirm receipt of the fax. The mailing address is:

   MDPH, Division of Epidemiology and Immunization
   Surveillance Program, Room 241
   305 South Street
   Jamaica Plain, MA 02130

f. Institution of disease control measures is an integral part of case investigation. It is the LBOH responsibility to understand, and, if necessary, institute the control guidelines listed below in Section 4), Controlling Further Spread.

4) CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements (*105 CMR 300.200*)

Note: For most cases of encephalitis there are no isolation and quarantine requirements. However, for encephalitis caused by an organism that is otherwise reportable, or for encephalitis caused by an arborvirus, please refer to Section 4) A of that specific organism or disease for the appropriate isolation and quarantine requirements.

B. Protection of Contacts of a Case

In most cases of encephalitis there are no recommendations for protection of contacts. However, for encephalitis caused by an organism that is otherwise reportable, or for encephalitis caused by an arborvirus, please refer to Section 4) B of that specific organism or disease.

C. Managing Special Situations

Reported Incidence Is Higher than Usual/Outbreak Suspected

If the number of reported cases in your city/town is higher than usual, or if you suspect an outbreak, investigate cases clustered in an area or institution to determine source of infection and mode of transmission. A common vehicle and mode of transmission should be sought and applicable preventive or control measures should be instituted. Additionally identification of common risk factors (such age, school, workplace, or activities) may lead to the institution of effective prevention and control measures. Consult with the epidemiologist on-call at the Division of Epidemiology and Immunization at (617) 983-6800 or (888) 658-2850. The Division can help determine a course of action to prevent further cases and can perform surveillance for cases that may cross several town lines and therefore be difficult to identify at a local level.

D. Preventive Measures

Due to the wide variety of etiologic agents that can cause encephalitis and differing modes of transmission, there is no single set of preventive measures to avoid infectious non-arborviral encephalitides. However, enteroviral and many other types of non-arborviral encephalitis may be prevented by enforcing measures that can prevent primary infection with the etiologic agent. You may want to recommend that individuals:

- Always wash their hands thoroughly with soap and water before eating or preparing food, after using the toilet and after changing diapers, after wiping or blowing noses and after contact with any nose, throat, or eye secretions.
- After changing diapers, wash the child's hands as well as their own.
- Dispose of towels or tissues contaminated with nose, throat or eye fluids in a sanitary manner.
- In a daycare setting, dispose of feces in a sanitary manner.
- If caring for someone with diarrhea scrub hands with plenty of soap and water after cleaning the bathroom, helping the person use the toilet, or changing diapers, soiled clothes or soiled sheets.
- Keep current on all recommended immunizations.

ADDITIONAL INFORMATION

There is no formal Centers for Disease Control and Prevention (CDC) surveillance case definition for infectious non-arborviral encephalitis. (CDC case definitions are used by the state health department and CDC to maintain uniform standards for national reporting.) There are formal case definitions for many of the primary infections that can then go on to encephalitic complications (*i.e.*, measles, mumps, varicella, etc.). For reporting to the MDPH, always refer to the criteria in Section 2) A.

REFERENCES

American Academy of Pediatrics. *1997 Red Book: Report of the Committee on Infectious Diseases, 24th Edition*. Illinois, Academy of Pediatrics, 1997.

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Chin, J., ed. *Control of Communicable Diseases Manual, 17th Edition*. American Public Health Association, 2000.

Mandell, G., Bennett, J., Dolin, R., eds. *Principles and Practice of Infectious Diseases, Fourth Edition*. New York, Churchill Livingstone Inc., 1995.

MDPH. *Regulation 105 CMR 300.000: Reportable Diseases and Isolation and Quarantine Requirements.* MDPH, Promulgated November 1998 (Printed July 1999).